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DISPOSITION OF THREE SPECIES OF ONISCOIDEA FROM WESTERN ATLANTIC SEASHORES (CRUSTACEA: ISOPODA: HALOPHILOSCIIDAE AND PHILOSCIIDAE)

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Abstract.—Three species of terrestrial isopods from the seashore, *Alloniscus compar* Budde-Lund, *Philoscia culebrae* Moore, and *Philoscia vittata* Say, are discussed. The first two are placed in *Vandeloscia* Roman (family Halophilosciidae), and *P. vittata* is placed in the new genus *Sayoscia* (family Philosciidae). Other related species are discussed briefly. Distribution and some general biology of the species are considered.

Three species of terrestrial isopod crustaceans, *Alloniscus compar* Budde-Lund (1893), *Philoscia culebrae* Moore (1901) and *Philoscia vittata* Say (1818), were among those included by Van Name (1936) in his comprehensive work on isopods from the New World. The true identity of the three has never been adequately resolved (Lemos de Castro 1965; Schultz 1974; Ferrara 1974) so with additional morphological evidence they are discussed and reclassified here. *Alloniscus compar* is considered to be too indefinitely known to be classified further, but records of specimens which have been called by Budde-Lund's name are reconsidered and placed in *Vandeloscia* Roman (1977). *Philoscia culebrae* is also placed in *Vandeloscia*. The species *Philoscia vittata* is placed in a new genus.

The two species of *Vandeloscia* are placed in the family Halophilosciidae (=Halophilosciinae Kesselyák, 1930, family Oniscidae as defined by Vandel 1962: 474) because they have similar genital apophyses, among other characters, which are used to define members of the group. The subfamily has been considered to be a full family by Vandel (1973:27) followed by Ferrara (1974:207) and Ferrara and Taiti (1979:110). No formal or actual raising of it to the full family level appears in the literature. The nominate genus *Halophiloscia* was described in the tribe Halophilosciini of the family Oniscidae by Verhoeff (1908:521). *Philoscia vittata*, although in many ways similar to species of *Vandeloscia*, is retained in Philosciidae principally because it lacks a bilobed genital apophysis.

Vandeloscia Roman, 1977

Vandeloscia Roman, 1977:146.—Ferrara and Taiti, 1979:110.

The genus was described on a species determined by Chelazzi and Ferrara (1978) and by Ferrara and Taiti (1979) to be a synonym of "*Littorophiloscia*" *compar* (Budde-Lund). The species "*compar*" has been placed in *Philoscia*, *Alloniscus*, *Littorophiloscia*, and "*Littorophiloscia*" so that Roman's description is the first time that "*compar*" as a species has been placed in a distinct genus. The inadequately defined, erroneously used name *Alloniscus compar* Budde-Lund (1893) which has been used several times in the past remains an uncertain species. The

species name of Strouhal (1966) has priority over that of Roman as will be shown below. *Alloniscus compar* of Vandel (1952) was adequately described and is identical to *Halophiloscia* (*Stenophiloscia*) *riedli* Strouhal (1966) and to *Vandeloscia orientalis* Roman (1977). The taxonomic status of the species is discussed under *V. riedli* here.

The genus was not defined in a separate section by Roman, who distinguished it from *Halophiloscia* Verhoeff by the setation of the palp of the maxilliped. Pleopod 1 of the male is used here to distinguish the genus and species rather than the much less definitive arrangement of setae on the palp of the maxilliped. A brief diagnosis of the genus is given here based on the two species now in the genus. The diagnosis of *Vandeloscia* Roman is written with the criteria for defining genera of Philosciidae, compiled by Vandel and listed by Taiti and Ferrara (1980:56), in mind.

Diagnosis.—Pleon narrower than peraeon; edges on pleonal segments show slightly (dorsal view). Pigmentation, especially on edges of peraeonal segments and on peraeopods, conspicuously arranged in chromatophores. No glands, but tiny lateral nodes present on peraeonal segments. Cephalon with no frontal line; supra-antennal line well defined. Tip of genital apophysis strongly bilobed. Endopod of male pleopod 1 with short, narrow apex strongly folded laterally. Peraeopod I sexually dimorphic. Dactylar organs present on peraeopods.

Type-species.—*Halophiloscia* (*Stenophiloscia*) *riedli* Strouhal (1966), by monotypy.

Derivation and gender of name.—The genus is named for the late French carcinologist, Dr. Albert Vandel. The gender is feminine.

Other species.—*Vandeloscia culebrae* (Moore, 1901) (see below).

Affinities.—The lobes on the tip of the genital apophysis are not as long in species of *Vandeloscia* as they are in species of *Halophiloscia*.

Vandeloscia riedli (Strouhal, 1966)
Fig. 1J–R

Alloniscus compar Budde-Lund.—Vandel, 1952:112, figs. 30–33.—Arcangeli, 1958: 242.—Cloudsley-Thompson, 1971:10.—Schultz, 1974:149 (as *P. compar* Budde-Lund, 1885).—Vandel, 1977:393.—Roman, 1977:135.

Littorophiloscia compar (Budde-Lund).—Lemos de Castro, 1965:94, figs. 31–33.—Chelazzi and Ferrara, 1978:192.—Ferrara and Taiti, 1979:110.

"*Littorophiloscia*" *compar* (Budde-Lund).—Ferrara, 1974:207, figs. 63–79.

Halophiloscia (*Stenophiloscia*) *riedli* Strouhal, 1966:325, figs. 1–23.

Philoscia (*Setaphora*) sp.—Roman, 1970:168.

Vandeloscia orientalis Roman, 1977:146, figs. 20–23.

Stenophiloscia riedli Strouhal.—Ferrara, 1974:212, fig. 82.

nec Alloniscus compar Budde-Lund, 1893:124.—Dollfus, 1893:345.—Van Name, 1936:218.—Arcangeli, 1960:47 (=*incertae sedis*).

The species is the same as that described by Vandel (1952) and Lemos de Castro (1965) from the New World, and Ferrara (1974), Roman (1977) and Strouhal (1966) from the Old World as comparison of their illustrations and those here will show. According to Arcangeli (1958:242) Vandel's *A. compar* is certainly not conspecific with Budde-Lund's *A. compar*. In fact there is no reason to believe

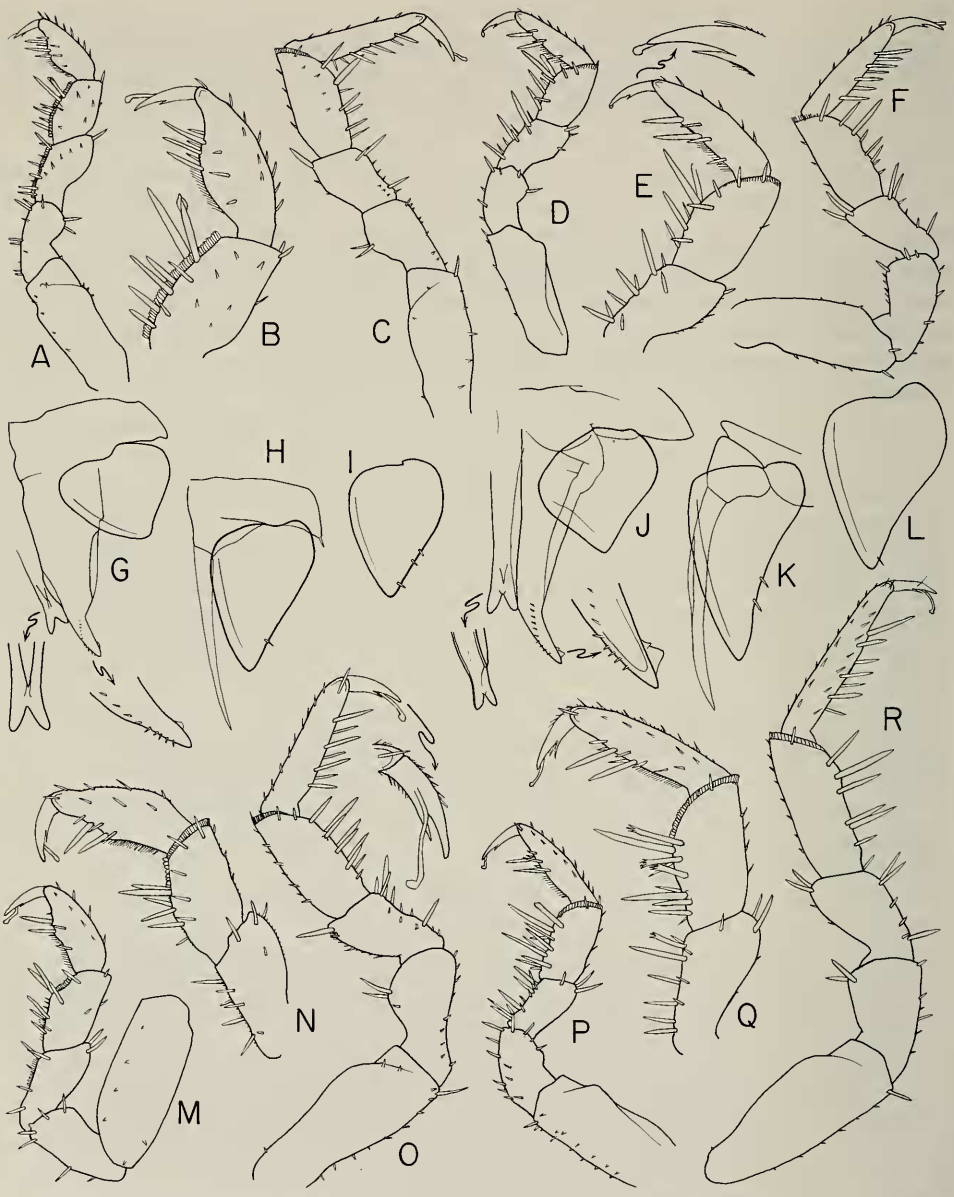

Fig. 1. A–I, *Vandeloscia culebrae*: A, Male peraeopod I; B, Detail male peraeopod I; C, Male peraeopod VII; D, Female peraeopod I; E, Detail female peraeopod I; F, Female peraeopod VII; G–I, Male pleopods 1–3. J–R, *Vandeloscia riedli*: J–L, Male pleopods 1–3; M, Male peraeopod I; N, Detail male peraeopod I; O, Male peraeopod VII; P, Female peraeopod I; Q, Detail female peraeopod I; R, Female peraeopod VII.

that it is the briefly described *Alloniscus compar* Budde-Lund (1893) which was not illustrated and which has as its type-locality "La Moka and vicinity of Caracas," Venezuela. The type-locality apparently is not a beach, nor near a beach, which is where all specimens like those described by Vandel (1952) and others

were collected. Until more specimens from the type-locality (the exact location of "La Moka" has yet to be determined) are available, *A. compar* Budde-Lund must be considered to be *incertae sedis*.

From Budde-Lund's brief Latin description without illustrations of *A. compar*, it can only be concluded that the species has eyes and three flagellar articles on antenna 2. The other characters of Budde-Lund's species are so generally described that they might be present on any oniscoid. Vandel (1952), when he used Budde-Lund's name for his specimens, made no mention of Budde-Lund's brief description. Since the locations of the collections of other species included by Budde-Lund (1893) were not at the seashore, *A. compar* probably was not collected there or it would have been mentioned. The location where the specimens of Vandel were collected was "Orchilla, Iles-sous-le-Vent, à l'est de l'Archipel de los Roques." The location is a tiny islet and, although not directly stated by Vandel, the specimens most probably were taken on the seashore as were some other species included by Vandel. The only thing which the collection locations of the two species have in common (assuming that "vicinity of Caracas" is inland like the city) is that they are in Venezuela.

Based on Vandel's description, Arcangeli (1958:243) removed *Alloniscus compar* of Vandel from *Alloniscus* Dana. Arcangeli stated that Vandel's *A. compar* probably belonged to a different genus of philoscomorph, which he did not name; he continued, however, to keep *A. compar* in *Alloniscus*. Roman (1977:135) also included *A. compar* in her list of species of *Alloniscus*, never relating it to *A. compar* of Vandel. Ferrara and Taiti (1979:110) finally showed the similarities of Vandel's and Roman's specimens, but did not discuss any of the taxonomic implications. *Vandeloscia riedli* is not completely redescribed here because Vandel (1952), Ferrara (1974), Roman (1977), and Strouhal (1966) adequately illustrated and described it. Details of male and female peraeopods I and VII and of male pleopods 1 and 2 are included here so the species can be easily distinguished from *V. culebrae* (Moore) with which it has been confused in the past.

Diagnosis.—Tiny, but obscure, lateral nodes present on all peraeonal segments. Endopod of pleopod 1 of male with large scalelike subapical process on laterally folded tip. Propodus of male peraeopod I with 2 large setae on inner margin. Exopod of pleopod 2 of male with 2 setae on posterolateral border.

Description.—See Vandel (1952:112, figs. 30–33), Ferrara (1974:207, figs. 53–79), Roman (1977:146, figs. 20–23) and Strouhal (1966:325, figs. 1–23) for descriptions. Strouhal illustrated the small lateral nodes on peraeonal segment I of his specimens, and they were present but very obscure on the specimens examined here. More than one specimen had to be examined before they were discovered. Apparently lateral nodes were missed by Roman (1977).

Measurements.—Males up to 5.9 mm long; females up to 6.0 mm long.

Type-locality.—Isle of Abu Mengar, south of Ghardaga, in the Red Sea of Egypt.

Distribution.—Gulf of Aquaba and Red Sea coast of Egypt; Suakin, Sudan; Sar Uanle and Gesira, Mogadishu, Somalia; Tulear, Madagascar; St. Helena Island, South Atlantic; Bay of Bengal, India; Yucatan, Mexico; San Pedro, Belize; Orchilla, Venezuela; Cabo Frio, Brazil.

Type-specimens.—Strouhal (1966) makes no mention of the disposition of the type-specimens, but they are probably in the Natural History Museum in Vienna.

Material examined.—Yucatan, Mexico, and Belize, Central America. Specimens from both locations have been deposited in the National Museum of Natural History.

Affinities.—See Affinities section under *Vandeloscia culebrae.*

Vandeloscia culebrae (Moore, 1901)
Fig. 1A–I

Philoscia culebrae Moore, 1901:176, pl. 11, figs. 13–17.—Richardson, 1905:604, fig. 660.—Boone, 1918:602.—Van Name, 1924:194, 195;—1936:168, fig. 86.—Vandel, 1968:114.—Schultz, 1974:149.

Halophiloscia culebrae (Moore).—Vandel, 1945:242;—1949:8.—Arcangeli, 1948: 482.—1958:242.

Littorophiloscia compar culebrae (Moore).—Lemos de Castro, 1965:96, figs. 36–39.

Philoscia miamiensis Schultz, 1966:457, figs. 1–33.

Alloniscus culebrae Moore, 1901.—Roman, 1977:137.

nec Philoscia culebrae.—Pearse, 1915:534, fig. B.

Moore (1901) gave a very general description of the two females which he collected on a beach on Culebra Island off Puerto Rico. The species generally is darker in color than *V. riedli,* but the chromatophores are still very conspicuous on the edges of the peraeonal segments and the peraeopods. The species is much like *V. riedli,* but differs from that species in the characters which are included in the diagnosis.

Diagnosis.—Tiny lateral nodes present on peraeonal segments. Endopod of pleopod 1 of male with small scalelike subapical process on laterally folded tip. Propodus of male peraeopod I with 3 large setae on inner margin. Exopod of pleopod 2 of male with 1 seta on posterolateral border.

Description.—See Schultz (1966) for overall view and Lemos de Castro (1965) for detail of male pleopods. Some differences or additions to the description include the fact that there are 9, not 21, ocelli, and tiny lateral nodes are present on the peraeopods. Even though the lateral nodes are tiny, they are more distinct than those of *V. riedli.*

Measurements.—Males up to 5.0 mm long; females up to 6.1 mm long.

Type-specimens.—Moore (1901) deposited his specimens (2 females) in the National Museum of Natural History. Very little is to be learned from them without dissection other than that they are similar when compared to fresh female specimens of the species from Cedar Key, Florida, and St. John, Virgin Islands.

Type-locality.—Culebra Island (east of Puerto Rico).

Distribution.—Culebra Island, Puerto Rico; Puerto Rico; St. John, Virgin Islands; east and west coasts of Florida. Abundant in maritime drift and other organic detritus on beaches.

Material examined.—Cedar Key, west coast of Florida, and St. John, Virgin Islands. Specimens from each location have been deposited in the National Museum of Natural History.

Affinities.—It is difficult to tell females of the two species apart so no attempt is made here to distinguish them. Although the range of color of individuals in a

freshly preserved group of specimens of both species is great, the average density of color of fresh specimens of *V. culebrae* is greater. The two species can best be distinguished by comparing the size of the scalelike process on the tip of the endopod of male pleopod 1. It is smaller and not always too distinct in *V. culebrae*; whereas it is larger and divided into one large and one small process as shown here (Fig. 1J) for *V. riedli*. The propodus of male peraeopod I bears three large setae in *V. culebrae* and only two in *V. riedli*. Other consistent differences are present on other appendages and can be seen by comparing the illustrations given here and those of other workers.

The differences present here which are used to distinguish the two species, in general, are valid if one also compares the two species as described from other locations or from the descriptions of other workers from the literature. Specimens of *V. culebrae* described by Schultz (1966, as *Philoscia miamiensis*) and Lemos de Castro (1965, as *Littorophiloscia compar culebrae*) have the same type of small scalelike process on the tip of the endopod of male pleopod 1. They also have the same corresponding configuration of setae on the inner margins of the propodus and carpus on male peraeopod I.

Specimens of *V. riedli* as presented in the illustrations of Vandel (1952, as *Alloniscus compar*), Lemos de Castro (1965, as *Littorophiloscia compar compar*), Strouhal (1966, as *Halophiloscia* (*Stenophiloscia*) *riedli*), Ferrara (1974, as "*Littorophiloscia*" *compar*) and Roman (1977, as *Vandeloscia orientalis*) have the same large scalelike process on the tip of the endopod of male pleopod 1. Correspondance between the configurations of other structures illustrated for the two species are also quite striking so that the two species can be said to be distinct both by using fresh specimens and by comparisons of illustrations and descriptions of the specimens in the literature. The differences are much more consistent than is to be expected at the subspecies level as was considered to be so by Lemos de Castro (1965). *Vandeloscia culebrae* is tropical in distribution, but it also ranges into subtropical Florida. *Vandeloscia riedli* is much more widespread on tropical beaches in the West Indies, Central America, and northern South America and is common in parts of the Old World as well.

Sayoscia, new genus

The single species of the genus lives along the eastern shore of North America from Canada to Texas. The genus is placed in the broadly defined Philosciidae, not Halophilosciidae, because the type-species does not have the bilobed genital apophysis characteristic of the Halophilosciidae. When more species of the philoscomorph complex of species of oniscoids are adequately defined, better criteria for separating the Halophilosciidae from the Philosciidae will be distinguished. The species is darkly pigmented with distinct chromatophores on the peraeonal segments and on the peraeopods. The genital apophysis is without a bilobed tip, but has well developed grooves on the edges into which the very broad endopods of pleopod 1 fit.

Diagnosis.—Peraeonal segments without glands, but with tiny lateral nodes (with seta about twice size of other body setae) on segments I–IV. Short apical extensions markedly bent laterally on tips of very broad endopod of male pleopod 1. Peraeopods I, II, and VII similar in males and females. Dactylar organs present

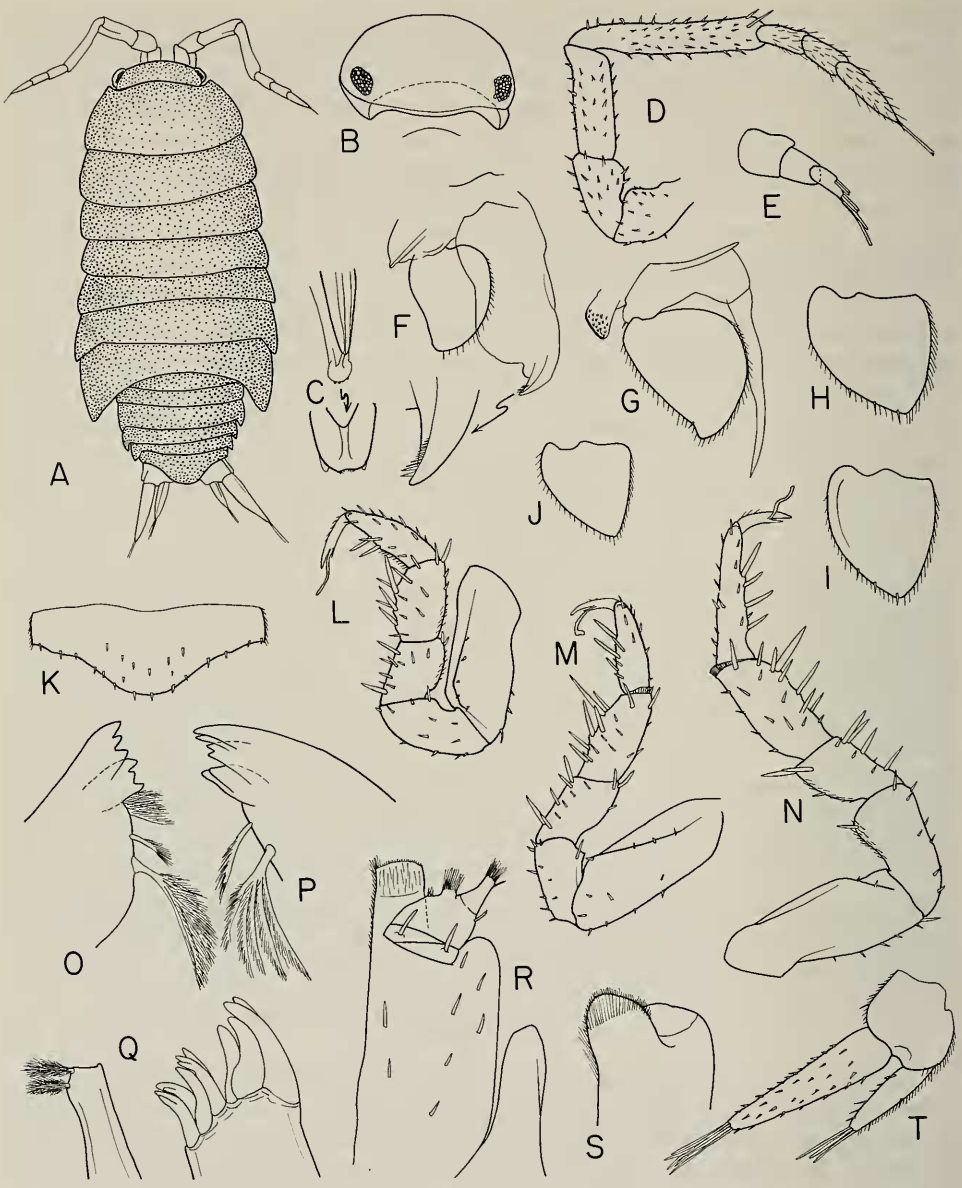

Fig. 2. *Sayoscia vittata*: A, Dorsal view male 4.3 mm long; B, Frontal view cephalon; C, Tip of genital apophysis; D, Antenna 2; E, Antenna 1; F–J, Male pleopods 1–5; K, Pleotelson; L–N, Male peraeopods I, II and VII; O, Left mandible; P, Right mandible; Q, Maxilla 2 (endopod and exopod); R, Maxilliped; S, Maxilla 1; T, Uropod.

on peraeopods. Mandibles with molar setae narrow at base with compound apex. Lacinia mobilis on each mandible.

Type-species.—*Philoscia vittata* Say (1818).

Derivation and gender of name.—The genus is named for Thomas Say, Amer-

ican entomologist and naturalist, who described the type-species. The gender is feminine.

Affinities.—The single species of the new genus is similar to species of *Vandeloscia* Roman, but lacks the bilobed tip of the genital apophysis found in species of that genus.

Sayoscia vittata (Say, 1818)
Fig. 2A–F

Philoscia vittata Say, 1818:429.—DeKay, 1844:50.—White, 1847:99.—Verrill and Smith, 1873:569.—Harger, 1879:157;—1880:306 (not pl. 1, fig. 1).—Budde-Lund, 1885:209.—Underwood, 1886:361.—Richardson, 1900:305;—1901:565;—1905: 605, figs. 662–663 (not fig. 661).—Paulmier, 1905:181 (not fig. 53).—Rathbun, 1905:45, 4.—Fowler, 1912:233 (not pl. 66).—Sumner, Osborn, and Cole, 1913: 661.—Pratt, 1951:442 (not fig. 611).—Kunkel, 1918:240 (not fig. 77).—Van Name, 1936:115 (not fig. 52).—Schultz, 1974, fig. 3b, c, f;—1975:186;—1977:154.

Philoscia robusta Schultz, 1963:27, figs. 1–22;—1965:108;—1966:461.

Philoscia (*Philoscia*) *muscorum* (Scopoli), var. *sylvestris* (Fabricius).—Blake, 1931:351.—Procter, 1933:248.

Philoscia muscorum (Scopoli).—Pratt, 1951:442.

Littorophiloscia vittata (Say).—Alexenburg, 1962:23.—Bousfield, 1962:51.—Lemos de Castro, 1965:90, figs. 21–30.

partim Philoscia muscorum (Scopoli).—Harger, 1880:306 (pl. 1, fig. 1).—Schultz, 1965:107.—1974:147.

The species was redescribed by Schultz (1963) as *Philoscia robusta*. It was further discussed as *P. vittata* Say by Schultz (1974) who showed how it and *P. muscorum* (Scopoli), which shares part of its range, were confused by early workers. Indeed, the illustration of Harger (1880, pl. 1, fig. 1) of *P. muscorum* has been repeated by most other workers who encountered *P. vittata* on the east coast of the United States. The two species easily can be distinguished by comparing male pleopods 1. The illustrations of the species here are of specimens collected in south New Jersey not far from the type-locality as recorded by Van Name (1936).

Diagnosis.—See generic diagnosis.

Description.—Schultz (1966) completely described the species as *Philoscia robusta* and into that description the information in the generic diagnosis section can be incorporated.

Measurements.—Males to 5.8 mm long; females to 6.0 mm long.

Type-locality.—Great Egg Harbor, New Jersey (Van Name 1936), or according to Say (1818), "United States, common." Say worked at the Academy of Natural Sciences, Philadelphia, and field trips frequently were taken to the New Jersey seashore. Say also toured much of the shore of the then United States and perhaps collected the species as far south as Georgia.

Type-specimens.—Dry specimens were deposited in the Academy of Natural Science in Philadelphia, but they are no longer present (Lemos de Castro 1965: 92). One dry specimen is present in the British Museum (Natural History) (White 1847) apparently presented by Thomas Say himself. Types and other specimens

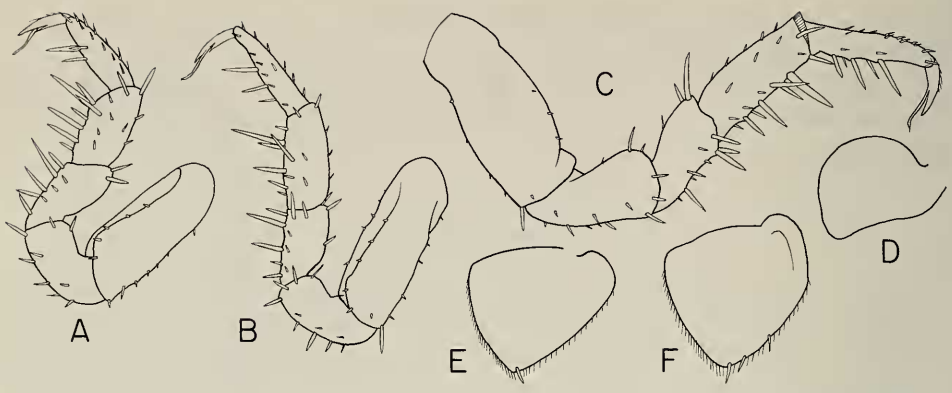

Fig. 3. *Sayoscia vittata*: A–C, Female peraeopods I, II and VII; D–F, Female pleopods 1–3.

of *Philoscia robusta* Schultz, a junior synonym, from near Beaufort, North Carolina, are in the National Museum of Natural History and more specimens from New Jersey have been deposited there in connection with this redescription.

Material examined.—The specimens examined here are from south Cape May County, New Jersey, on the edge of Grassy Sound.

Distribution.—The species is present on the Atlantic coast of North America from the Bay of Fundy, Canada, to the mouth of the St. Marys River, Georgia. Specimens are present on the Gulf shore at least to the southern Texas coast. They are abundant in decayed organic vegetation, under the maritime drift in marine swamps, and in places regularly moistened by marine or estuarine waters.

Disposition of some species of philoscomorphs from the New World which have been considered related to the three species considered above are those of the "Halophiloscia" group of Van Name (1936:167, 515). The species are *Philoscia bermudensis*, *P. brasilensis*, *P. culebrae*, *P. culebroides*, *P. nomae*, and *P. richardsonae*. Vandel (1945:242, 1949:8) gives maps of the distribution of the species of *Halophiloscia* Verhoeff including members of Van Name's "Halophiloscia" group. Vandel (1962:475) considered *Littorophiloscia* Hatch (1947) to be a junior synonym of *Halophiloscia* Verhoeff, but later (1968:113) he considered it to be valid with one species *L. richardsonae* (Holmes and Gay), the type-species. Lemos de Castro (1958a, 1965) included *Alloniscus compar* Budde-Lund and *Philoscia vittata* Say and some of the above species of the "Halophiloscia" group as definitely or tentatively in *Littorophiloscia* Hatch. He based his conclusions on similarities of certain characters, especially general similarities of the shapes of the endopods of male pleopod 1, to those of *L. richardsonae*.

The disposition of all species considered in the "Halophiloscia" group of Van Name (1936) and *Littorophiloscia* as expanded by Lemos de Castro (1965) is given below. Formal synonymies for species in the list and not included in synonymies above are to be found in the works mentioned after the valid name of the species.

Philoscia bermudensis Dahl = *Halophiloscia couchi* (Kinahan); see Vandel (1962: 477), and Schultz (1972:86).

Philoscia bonariensis Giambiagi de Calabrese = *Halophiloscia couchi* (Kinahan); see Reca (1972:407).

Halophiloscia brasilenses Moreira = *Benthana olfersi* (Brandt); see Lemos de Castro (1958b:98), and Vandel (1962:475).

Alloniscus compar Budde-Lund = *incertae sedis*; see text.

Alloniscus compar Budde-Lund of Vandel (1952:112) = *Vandeloscia riedli* (Strouhal); see text.

Philoscia culebrae Moore = *Vandeloscia culebrae* (Moore); see text.

Philoscia culebroides Van Name = *Nesophiloscia culebroides* (Van Name); see Vandel (1968:113).

Philoscia nomae Van Name = *Nesophiloscia culebroides* (Van Name); see Vandel (1968:113).

Philoscia richardsonae Holmes and Gay = *Littorophiloscia richardsonae* (Holmes and Gay); see Lemos de Castro (1965:88), and Vandel (1968:113).

Philoscia vittata Say = *Sayoscia vittata* (Say); see text.

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